Supplement One
to
Commander's Handbook
for an
Effects-Based Approach
to
Joint Operations
(Theory)

Joint Warfighting Center

Joint Concept Development and Experimentation Directorate

Standing Joint Force Headquarters

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SUPPLEMENT I
THEORY

"Compared to the analytical procedure of classical science with resolution into component elements and one-way or linear causality as basic category, the investigation of organized wholes of many variables requires new categories of interaction, transaction, organization, teleology..."

Ludwig von Bertalanffy

1. Introduction

a. During concept development, the effects-based approach was labeled "EBO" and it was defined as: **"Operations that are planned, executed, assessed, and adapted based on a holistic understanding of the operational environment in order to influence or change system behavior or capabilities using the integrated application of select instruments of power to achieve directed policy aims."** It was composed of three basic processes: planning, execution and assessment. (Figure 1.) Plus, this concept was based on a "system-of-systems" view of the battlespace.

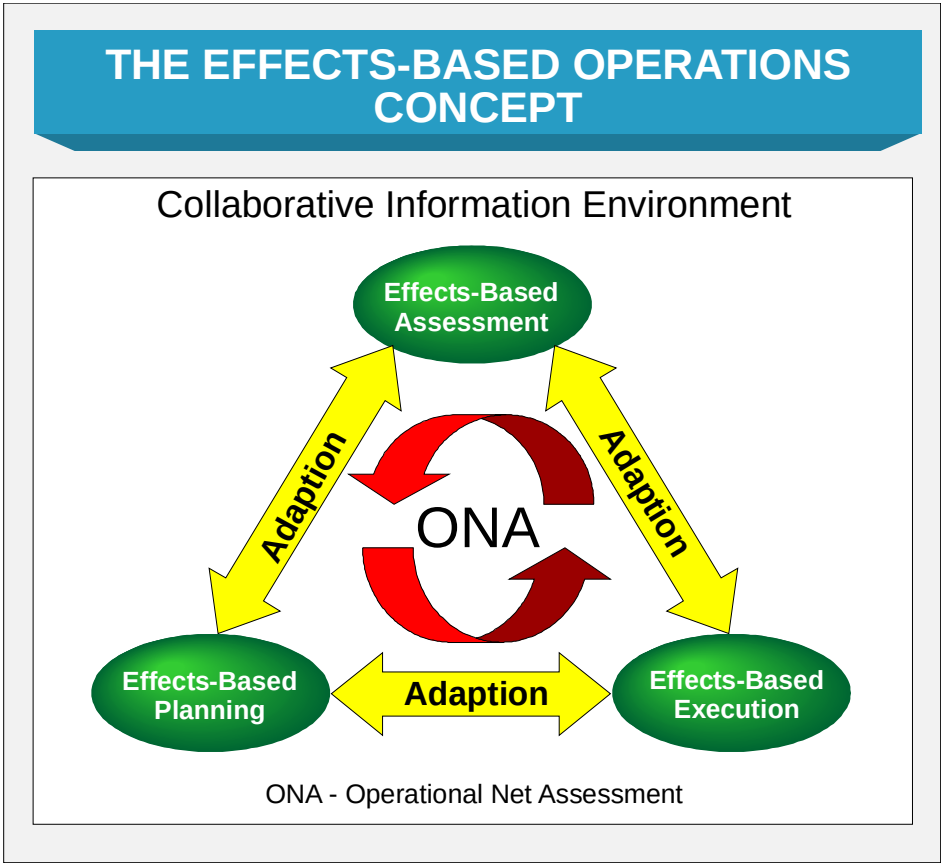

Figure 1. The Effects-Based Operations Concept

b. As the concept evolved in USJFCOM, EBO became focused on the theater strategic and operational echelons and was largely confined to processes used by JFCs and their staffs. It also was entwined with other concepts, most notably, Operational Net Assessment (ONA) and the Collaborative Information Environment (CIE). **While ONA represents one technique to gain a systems perspective, the technique is not inherent to the effects-based approach.** As for CIE, it is applicable to any joint process where collaboration is needed. Although important to joint command and control, **CIE is not unique to an effects-based approach. In sum, the core aspects of an effects-based approach have remained on planning, execution, and assessment** (Figure 2).

2. Systems Theory

a. **An effects-based approach is founded on "General Systems Theory," not "Chaos Theory" or "Complex Adaptive Systems" methods addressed in the mathematical sciences**. General Systems Theory addresses both "open" and "closed" systems. These systems are usually categorized according to their complexity. (See Figure 3.) **Closed systems** are less complex and normally composed of non-organic elements. Conversely, **open systems** are comprised of living organisms—some of which can change dynamically into an infinite combination of organizational and functional arrangements. It is these

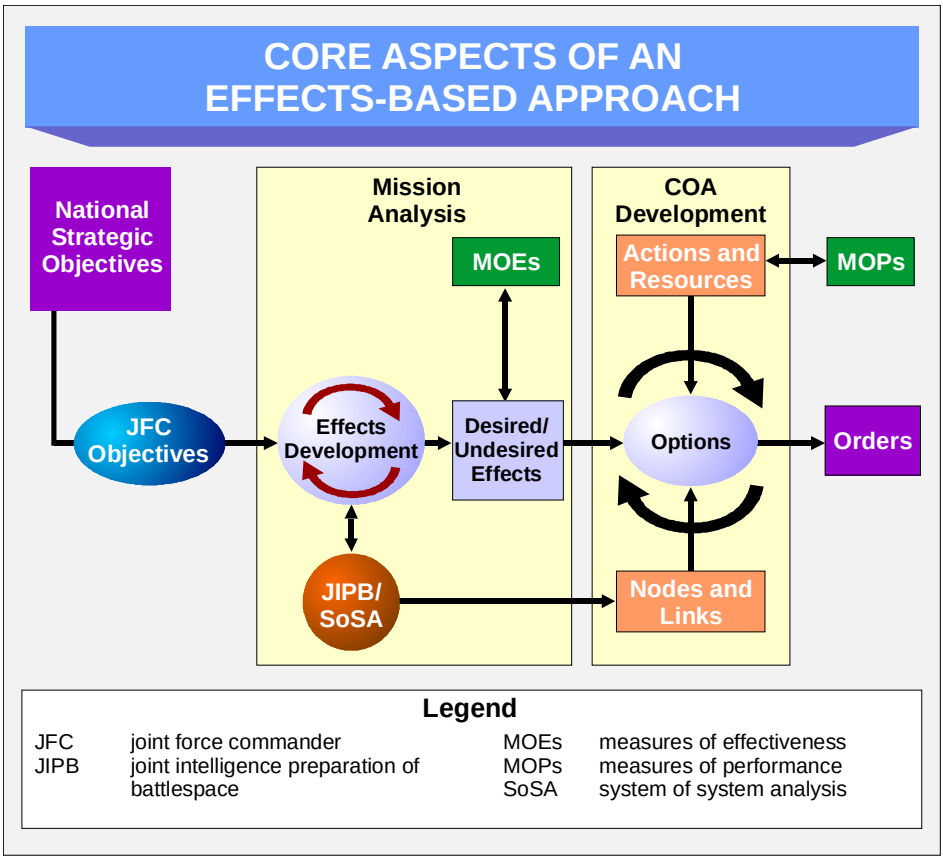

Figure 2. Core Aspects of an Effects-Based Approach

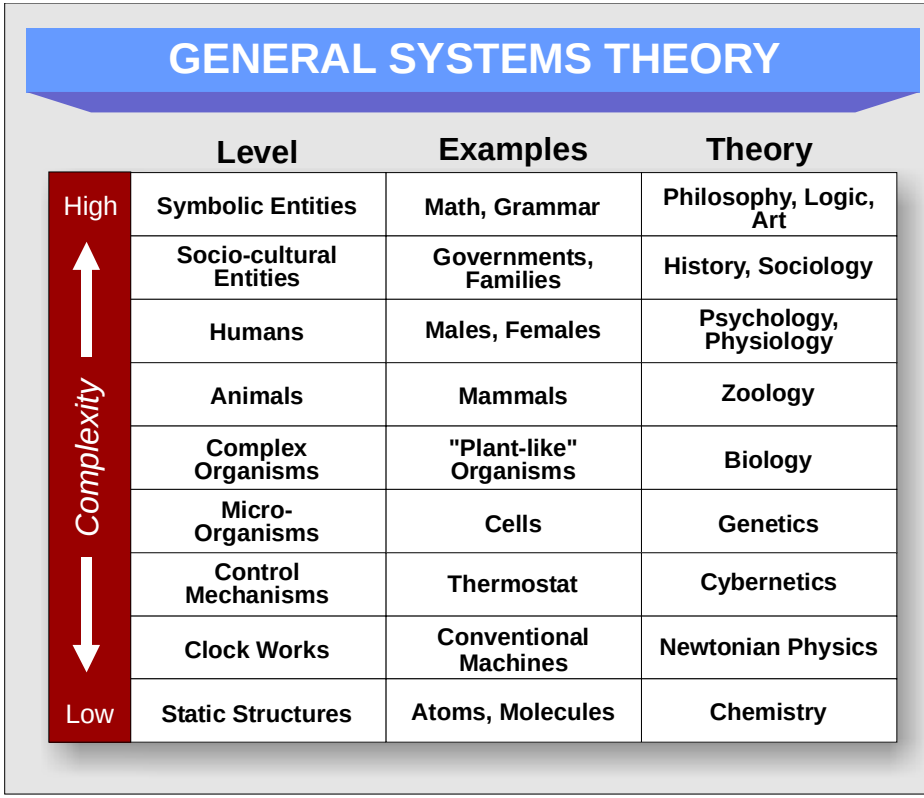

Figure 3. General Systems Theory

more complex systems—particularly the human, socio-cultural, and symbolic or metaphysical—that encompass the "real world" in which the joint force commanders (JFCs) and their staffs operate. In sum, **JFCs deal with "open systems"** that have been "bounded" through the application of operational art and design.

b. Joint force commanders (JFCs) view the real world as a set of systems composed of tangible elements (nodes) and their relationships (links) to each other. The nodes represent discrete elements (people, materiel, facilities, and information) and the links portray the physical, functional and/or behavioral relations that can exist between and among nodes and systems. **Both nodes and links are only symbolic. They are "icons" meant to simplify the complexity of the real world:** to make important the things in the battlespace that the JFCs may wish to influence or change during an operation.

c. To be manageable, the real world is reduced to an operational environment that is bounded in space, time and purpose. **JFCs first identify the systems, nodes and links according to their potential applicability to the purpose of an operation** and then on the timing and the scope of an operation. At a minimum, JFCs specify the relevant systems in the operational environment (OE) that could be affected. These systems normally include the political, economic, social, informational, and others. Then, nodes are designated in each system as candidates for action. In turn, these nodes are then linked to nodes within a system and with nodes in other relevant systems to anticipate any "nth" order effect that might result from unified action.

d. **Understanding the idea of a "system" is essential to comprehending the effects-based approach.** A system is any complex set of elements (nodes) that are interconnected (via links) with one another and has a clearly defined boundary. A system's variables—the things about a system that change; the things that can be acted upon to influence the system—include the nodes that make up the system and the links by which those nodes interact with one another. The behavior of a system is the product of the dynamic interaction of its various nodes and links. Systems by this definition can take any number of forms. A military organization, large or small, is a system, the output of which is the actual or potential generation of combat power through various command and control, logistic, maneuver, protection, fires and other capabilities. **Two or more military organizations locked in an engagement, battle, campaign or war constitute a system, the outcome of which is changes in the state of each organization, in the surrounding operational environment and in their mutual relationship.** Governments, populations, economies and cities are all systems. These social systems tend to exhibit a willful behavior that is often messy and unpredictable. Likewise, railway networks and electrical power grids are also examples of systems often of military interest, but these tend to exhibit more mechanistic and predictable behavior.

e. A key aspect of an effects-based approach is the causal interaction by which implementation is expected to bring about success—in whatever manner success may be defined—the desired effects and their MOEs. **The aim is to fundamentally alter or influence the behavior or capability of the target system in ways intended to render it more amenable to strategic and operational objectives through the multiple, integrated and simultaneous actions directed at key system nodes and links.** The desired effect could take various forms in practice depending on the actual situation. In the case of combat, for example, the desired effect could be crippling or paralyzing the enemy system so that it can no longer function as a cohesive, purposeful whole—even if entire elements of that system may remain undamaged. By contrast, in the case of disaster-relief operations, the desired effect could be transforming the affected social system—the local government and population—into a cohesive, functioning and stable whole able to sustain itself. In the case of strategic deterrence, the desired effect would be convincing the targeted decision-making system to consider only a narrow, acceptable range of COAs.

f. While a particular effect may be desirable from a friendly point of view, whether it will produce the desired result in the target system depends not primarily on friendly intent, but on the internal dynamics of that system. Some systems are amenable to certain influences, while others are not. As mentioned, **many systems can be highly resistant to efforts to change their state, regardless of the amount of effort expended**. As an example, while in combat it may be desirable to cripple an enemy systemically depending on the enemy (and the ability to understand its inner workings), there may be little choice but to defeat the enemy system cumulatively by wearing down each of its subsystems.

g. For JFCs and staffs, a system perspective has, at least, four levels of comprehension or situational awareness. At the lowest level is recognition of the relevant systems or nodes pertaining to the purpose of a specific operation within an operational environment. In turn this **data** reaches the level of **information** when the links—whether transitory or enduring—between systems and nodes is known with some confidence. Then, **knowledge**

of the OE occurs when the dynamic between systems is discerned—in terms of nodes and links—that can explain how the system functions or behaves normally or currently. And, finally, **understanding** of the OE is reached when the commander and staff can anticipate (better than the adversary) the effects within an OA that could result from various friendly and enemy courses of action or other events not directly related to the operation.

Levels of Situational Awareness of the "System"

Data: What are the facts: the relevant systems and nodes in an operational environment?

Information: How do they relate to each other: the links between nodes and systems?

Knowledge: How do they function: the interactions between systems, nodes, and links?

Understanding: What do they mean: the anticipated effects on and among systems?

h. Lastly, **no wise commander believes that most systems can be understood with anything resembling certainty or that systems can be manipulated with anything approximating deterministic mastery or precision**. Effects-based approach does not a call for a systems engineering approach to the conduct of military operations. In fact, this concept is based on incomplete and often contradictory understanding of the nature of systems. **Most systems will confound detailed understanding; their nodes and links often cannot be accurately mapped; much of their inner dynamics will remain opaque to comprehension.** Systems will often exhibit unpredictable, surprising and uncontrollable behaviors. Sometimes systems will absorb outside actions with little or no apparent change in system state; while at other times, systems will submit to outside influences, although the results will rarely be exactly as expected. **Unintended consequences will be commonplace.** Most systems will react to the actions taken upon them. While some subsystems of military interest are essentially mechanical systems and will submit to analytical methods, **most systems of military interest ultimately are not amenable to analytical or engineered solutions**. System end states will rarely be determinable in advance of operations, even though the desired end states need to be articulated for assessment, planning, and execution. Instead, implementation of **an effects-based approach calls for a significant level of humility in expectations of certainty, precision, and control**. This concept argues rather for a framework that sees operations as learning—that is, military actions themselves become an experiential means of learning about the target system. Rather than being an engineered solution, an effects-based operation evolves as the joint force adapts responsively to the target system as it adapts to it.

3. Systems, Center of Gravity

a. Clausewitz's idea of "center of gravity" concentrated on attaining a specific effect. Moreover, **for Clausewitz the "schwerpunkt" is defined with respect to the entire system of the enemy**. His concept did not distinguish between strategic, operational and tactical COGs.

b. Unlike Clausewitzian thought, an effects-based approach extends beyond the enemy to the entire OE and its political, economic, social, ideological and other enabling systems that support the global, regional, or national grouping to be influenced. These systems may be trans-regional, transnational, or connected in functional and behavioral ways that are based on political, familial, commercial or cultural relationships. The point is that **an effects-based approach takes a systems perspective to explain the behavior of the entire OE: how it currently behaves and how it might behave under various influences and actions**.

4. Implications of an Effects-based Approach

a. First **and foremost an effects-based approach is about fundamentally changing the way the joint community and interagency think**. Changing the way JFCs and joint staffs think about themselves, the adversary and OE and who they include and what they emphasize during planning, execution and assessment. Secondly, this approach is about "doing the right things," not primarily about "doing things right." Too often within the fog and friction of operations commanders do the wrong things extraordinarily well. Allied soldiers are killed by friendly fire, targets are destroyed that only serve to strengthen, not weaken enemy will or have a negative impact on the execution of subsequent phases of an operation or campaign. This approach seeks to understand the relationships and linkage between operational objectives, the effects that must be attained within an operational area (OA) and the tactical actions required to create those effects in order to understand and manage the consequences of friendly actions—desired or undesired.

b. An effects-based approach is not exclusively a military enterprise. In fact, while the military instrument of power may be the most visible, it may be the least active or decisive in determining the long-term solution to a crisis. From a strategic perspective, military operations are never conducted to achieve strictly military objectives. They are always subordinate to and in support of national policy aims, objectives and end states, and for now and in the foreseeable future, conducted within a joint, multinational, interagency context.

c. **An effects-based approach** is different from some other approaches to operational art. These differences are both qualitative and quantitative. It **is a front-end loaded process that demands that the "ends" of an operation are fully vetted and understood before tasks or actions are entertained**. Accordingly, an effects-based approach demands new thinking from JFCs and their staffs. (Figure 4.)

(1) Holism. **The battlespace must be viewed as a whole.** This view cannot be constrained by time or space. If commanders are going to act within the battlespace, they must understand all the key systems, nodes and their links regardless of geographic or temporal proximity. They cannot afford to reduce the battlespace to its component parts and disregard the interconnectivity to the larger world. (Yet, JFCs must bound and define the OA for their operations—with the understanding that the battlespace is not a "closed" system. The expansiveness and adaptability of human nodes guarantees that most key systems are "open" systems that are only depicted as "closed" systems for operational purposes.) Their view must be as broad as possible with sufficient specificity to capture the nature of the battlespace system they intend to affect. Finally, the OE is not restricted

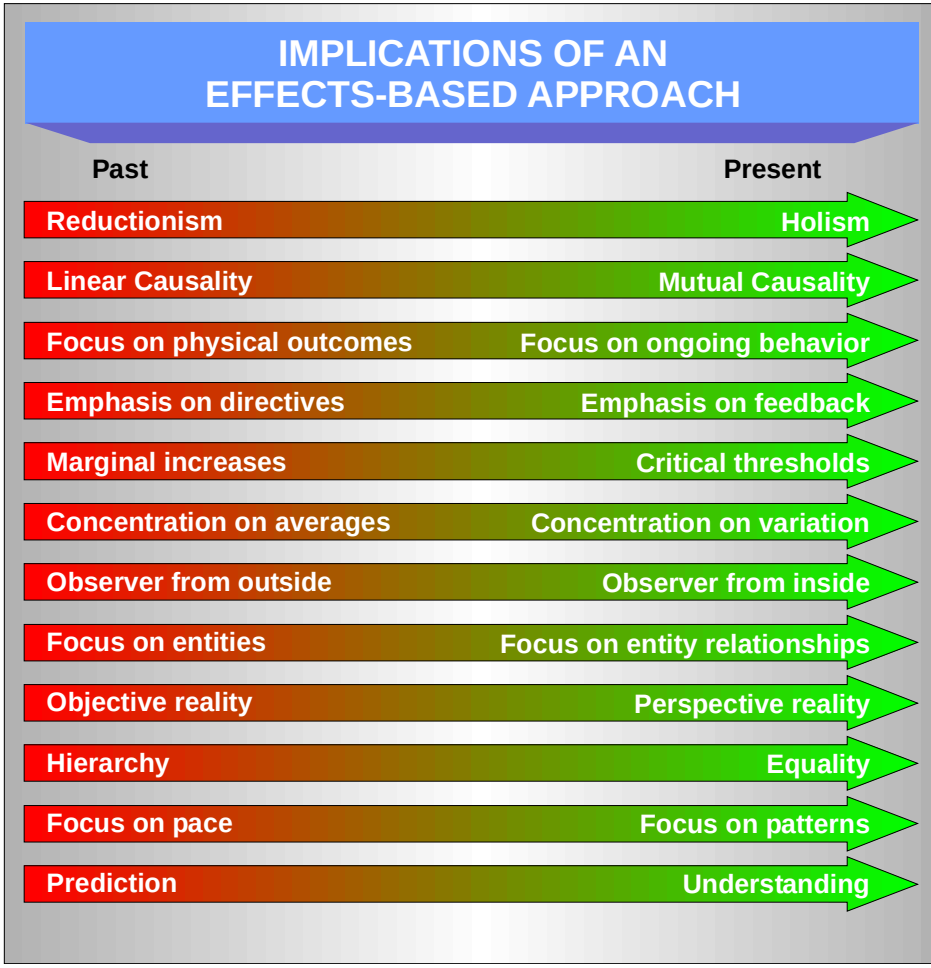

Figure 4. Implications of an Effects-Based Approach

to the physical domains of air, land, sea and space, but also includes the cognitive and informational domains of the contending decision makers and their various means of acquiring and communicating knowledge.

(2) Mutual Causality. **Reciprocity is the battlespace norm between friendly and adversarial "actors" within the OE.** While one actor may appear to initiate an action, the action is often a reaction to a perceived or anticipated action of another actor. Therefore, the relationship of cause and effect must not be viewed as linear or unidirectional. The better view is that cause and effect are more reciprocal, especially between contending human organizations.

(3) Focus On Ongoing Behavior. In many operations, the tendency is to focus on physical outcomes—the proximate result of an action. But these outcomes—physical or behavioral—are often transitory and do not reflect a persistent state of a system, node or link. Moreover, the current behavior of an entity or node may be aberrant, giving no indication of its future behavioral "trajectory." Thus, **the system should be**

assessed continuously to ascertain both human/system behavior and capability: to discern relatively enduring patterns of behavior.

(4) Emphasis on Feedback. Adaptation is crucial to an on-going campaign or operation. And in some operations the emphasis is on "directives" and their associated tasks/actions. Success is measured by task accomplishment vice effects attainment. Yet, continuous feedback on constantly evolving enemy and friendly behavior is how the joint commanders will adapt and secure victory. **Pivotal to superior decision-making is developing the measurements that can offer the best explanation of systemic change and how that change relates to the objectives being pursued.**

(5) Critical Thresholds. Because human behavior is often latent or slowly emergent, effects need to be measured by thresholds rather marginal system changes. MOE indicators should be constructed to determine when persistent change has occurred. **Many behavioral changes will be "full blown" when first manifested—having remained unobservable or dormant until the cumulative weight of actions have achieved their psychological or sociological result.**

(6) Concentration on Variation. Assessment is not predicated on averages, but rather on variations, particularly, of system behavior. Incremental change as measured by averages may distort a significant alteration in behavior if the system, nodes or links are poorly understood. But in order to discern variation, a threshold or standard must be defined to gage variability: not just deviation from the standard, but the "meaning" of the deviation.

(7) Observer in the Observation. Essential to a systems perspective is the realization that the **friendly commanders and their staffs are actors inside the battlespace**. And therefore, their observations are as observers inside the system and are subject to the distortions inherent from their internal vantage point. They do not have a god-like external view as they are inextricably enmeshed in the battlespace once they choose to think and act within the OE.

(8) Focus On Relationships (Links) between Entities (Nodes). **The links (or the relationships) between nodes are key to system understanding**, as their junctures can suggest which nodes are most important to the behavior of the system. Those nodes that can be identified as having significant relations to other systems or nodes (and which together appear to have a major influence on the functioning of these systems/ nodes) are the best candidates for action.

(9) Perspective Reality. **The echelon of the observer or decision maker determines what can be perceived.** The perception of ends and means can be different at the strategic, operational and tactical levels. In the "objectives-to-effects-to-tasks" process, "ends, ways, and means" can become confused. But a target effect is not the same as an operational effect, which is different from a strategic effect. Some effects may be viewed as a means to other more comprehensive effects. Therefore, **commanders at all echelons will have to constantly delineate the ends from the means to ensure the higher headquarters intent is preserved from start to finish of an operation**.

(10) Equality. The importance of an element in the battlespace cannot be determined using a hierarchical perspective: its position in the hierarchy. **Most human systems have extraordinarily complex dependencies and cannot be affected as intended without determining the individual element's contribution to the larger system.** Depending on the effect desired, the importance of an element will fluctuate. And consequently, if the ends are not understood at all echelons, the presumption will be that the classical (and often erroneous) centers of gravity—leadership, C2, lines of communication, etc.—are most relevant to the success of the operation.

(11) Focus On Patterns. In formulating and measuring effects, commanders are looking for patterns of behavior among friendly and adversary systems to detect deviations from desired behavior. They learn pattern recognition by observing and studying the systems in peace, crisis and war. They and their staffs immerse themselves in the culture of the group to be influenced, but **resist stereotypical or "mirror-imaging" interpretations** (for example, Blue's view of Red's perspective on Blue's likely COA) to simplify or limit their options or courses of action. JFCs cannot allow an expectation of an operation's pace to lead to premature decisions and superfluous friendly actions.

(12) Understanding. Only a systems understanding will suffice. Commanders employing effects-based thinking must fully comprehend the political, economic and social context, both domestically and internationally. They must understand themselves, their adversaries and the situation in which they contend. The goal is to be proactive: to anticipate and prevent or preempt a crisis or an intra-war disaster. **Understanding the world in its totality—as both a functional and dysfunctional system—is indispensable to developing an operational design that can be sufficiently anticipatory.**

5. Boundaries of an Effects-based Approach

a. Arguably, traditional military operations—and most doctrine—have been focused on physical domains and kinetic actions. Certainly, information operations have extended the battlespace to the cognitive domain more than ever before. But effects-based operations are intended to have more expansive boundaries in time, space or purpose.

b. Effects-based operations are the ultimate expression of unified action. They consider all the instruments of power for use as early as possible to continuously shape the operational environment. They support national interests and objectives, always seeking to preclude or preempt major combat operations. In sum, these operations offer more options, especially with regard to ways or means (Figure 5).

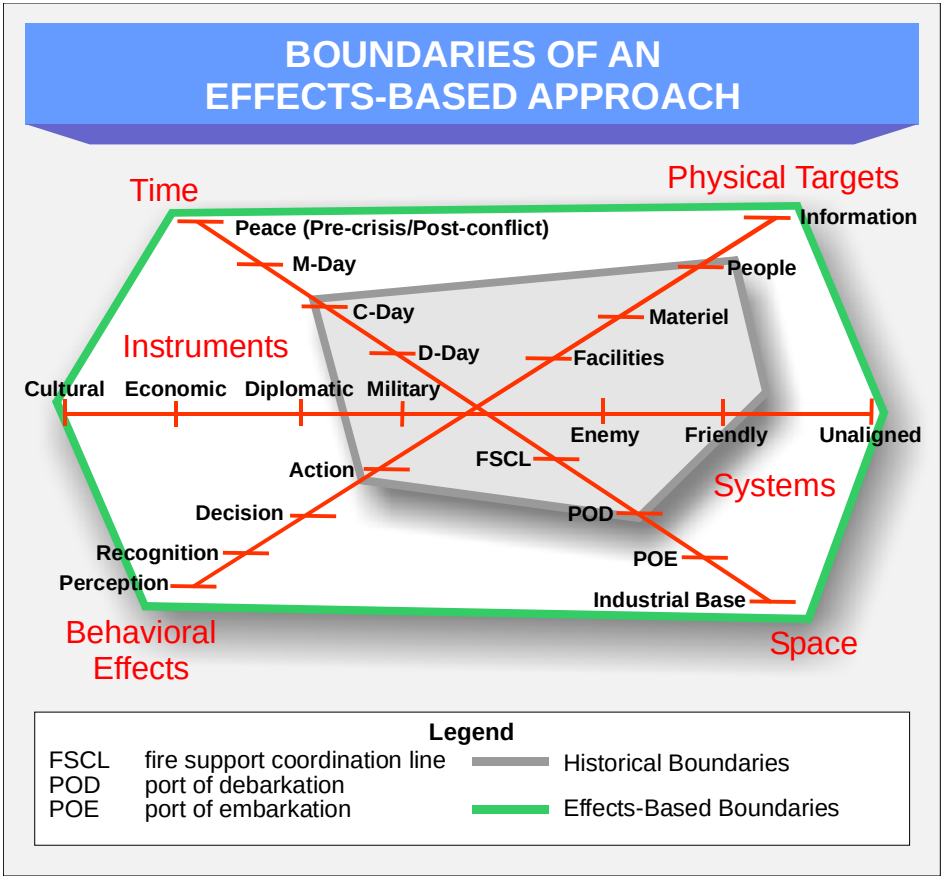

Figure 5. Boundaries of an Effects-Based Approach


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